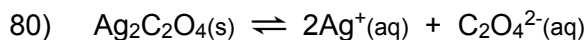
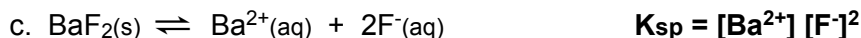
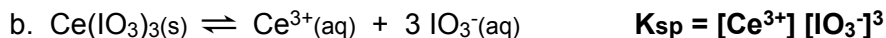


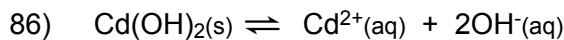
Assignment 15.3

Questions 76, 80, 86, 92, 94, 98, 100

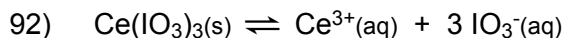


$$K_{\text{sp}} = [\text{Ag}^+]^2 [\text{C}_2\text{O}_4^{2-}]$$

$$= [2.2 \times 10^{-4}]^2 [1.1 \times 10^{-4}] = \mathbf{5.3 \times 10^{-12}}$$

**+x +2x**

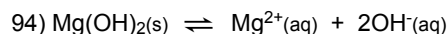
$$K_{\text{sp}} = 5.9 \times 10^{-11} = [\text{x}] [2\text{x}]^2 = 4\text{x}^3 \quad \mathbf{x = 2.5 \times 10^{-4} \text{ M}}$$



$$K_{\text{sp}} = [4.4 \times 10^{-8}] [0.20]^3$$

$$= \mathbf{3.5 \times 10^{-10}}$$

	$[\text{Ce}^{3+}] (\text{M})$	$[\text{IO}_3^-] (\text{M})$
I	0	0.20
C	$+ 4.4 \times 10^{-8}$	$+ 3(4.4 \times 10^{-8})$
E	4.4×10^{-8}	0.20



$$8.9 \times 10^{-12} = [0.00052] [\text{x}]^2$$

$$1.71 \times 10^{-8} = [\text{x}]^2$$

$$1.31 \times 10^{-4} = [\text{x}] = [\text{OH}^-]$$

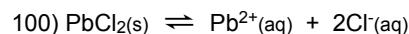
$$\text{pOH} = 3.88 \quad \mathbf{\text{pH} = 10.12}$$

	$[\text{Mg}^{2+}] (\text{M})$	$[\text{OH}^-] (\text{M})$
I	0.052	
C	- 0.05148	- 0.103
E	0.00052	x

98) $\text{Mg}(\text{OH})_2$ is the only possible precipitate. The ppt will form if $Q > K_{\text{sp}}$

$$[\text{Mg}^{2+}] = 2.0 \times 10^{-4} \text{ M} \quad Q = [2.0 \times 10^{-4}] [1.0 \times 10^{-4}]^2$$

$$[\text{OH}^-] = 1.0 \times 10^{-4} \text{ M} \quad Q = 2.0 \times 10^{-12}$$

Since $Q < K_{\text{sp}}$, no precipitate will form.

It is easier to assume that the precipitation reaction goes to completion first, and then figure out how much will dissolve back into solution.

initial precipitation

	$[\text{Pb}^{2+}] (\text{M})$	$[\text{Cl}^-] (\text{M})$
I	0.050	0.50
C	- 0.050	-0.10
E	0	0.40

dissolution

	$[\text{Pb}^{2+}] (\text{M})$	$[\text{Cl}^-] (\text{M})$
I	0	0.40
C	+ x	+ 2x
E	x	0.40

$$1.6 \times 10^{-5} = [\text{x}] [0.4]^2 \quad \text{x} = 1.0 \times 10^{-4} \text{ M}$$

$$\mathbf{[\text{Pb}^{2+}] = 1.0 \times 10^{-4} \text{ M} \quad [\text{Cl}^-] = 0.40 \text{ M}}$$